NATIONAL SCIENCE FOUNDATION
4201 WILSON BOULEVARD, Room 1270
ARLINGTON, VIRGINIA 22230
Tel. 703-292-8040 ~ Fax. 703-292-9040

OFFICE OF
INTEGRATIVE
ACTIVITIES

Response to Findings and Recommendations of the MRI Committee of Visitors Report of September 06, 2010

The MRI Committee of Visitors (COV) met June 10-11, 2010 at the National Science Foundation to review the MRI program for the period FY 2005 – FY 2009[1]. This review was undertaken to provide NSF with an independent evaluation that:

- Assessed the quality, integrity and transparency of program operations and program-level technical and managerial matters pertaining to proposal decisions; and
- Commented on how the results generated by awardees have contributed to NSF's mission, the attainment of NSF's strategic goals, and MRI program objectives.

The report prepared by the COV, and presented to OIA on September 6, 2010, reflects a valuable evaluation of the program. Dr. W. Carl Lineberger served as Chair of the COV and led its detailed analysis of 156 of the MRI program actions, including 81 awards and 75 declinations, taken during the period of review. Each COV member was first assigned six MRI proposals that were aligned with the individual member's core disciplinary expertise. The members were then assigned to review six proposals that fell into one of three broad categories: "What is Proposed" (acquisition versus development proposals, large versus small requests), "Who is Involved" (women, minorities, new PI involvement on proposals) and "Where is the Proposed Activity to Take Place" (institution type including minority serving and non-Ph.D.-granting institutions, geography including EPSCoR jurisdictions).

As a result of its evaluation of the MRI program, the 2010 MRI COV provided a number of specific findings and recommendations in their report. An Executive Summary of the OIA response to the overall report is provided on the next page. Responses to specific findings and recommendations of the COV are presented in the numbered sections that follow. Some recommendations warrant further exploration and the MRI program will provide additional information regarding these recommendations in its annual COV updates.

EXECUTIVE SUMMARY

As the coordinating office for MRI, the Office of Integrative Activities (OIA) appreciates the COV's finding that the "overall quality of the management of the MRI program by OIA is excellent, especially in light of the enormous volume of proposals, reviews, and awards being processed," and that the management of the program is "strong and effective." OIA welcomes the COV advice that high levels of MRI program staffing should be ensured in order to maintain the quality and uniformity of the review process and to better understand and convey the MRI

[1] Excluding the special MRI-Recovery and Reinvestment (MRI-R^2) competition.

program's long-term contributions to science and the infrastructure of science. OIA also values the COV's confidence in the Office as reflected in the recommendation for an OIA role in managing a possible Foundation-wide mid-scale instrumentation program.

The report notes that COV members "gained great respect for the complexity of the challenges that the MRI program faces." Hence OIA especially appreciates the COV assessment that the reviewer selection is balanced, that the "overall review process is sound and fair," and that the MRI program is "largely successful in balancing awards across multiple dimensions: scientific disciplines, size of award, university size and research/educational orientation, geographical diversity, etc." OIA is also pleased that the 2010 MRI COV concludes that the program has "substantial accomplishments" and that it "plays a very important role" in building the nation's research capability. OIA welcomes the COV endorsement of a planned survey of MRI PIs to assess near-term and long-term impacts of the MRI program.

The 2010 MRI COV noted that the distributed review of MRI proposals among discipline-specific divisions and offices "presents a significant management challenge," a conclusion with which OIA agrees. As a result, the COV recommended throughout their report that the MRI program pay close attention to documentation to promote greater uniformity and transparency in the review process. At the same time, the COV notes "the key role that the disciplinary reviews play, and the necessity for these disciplinary areas to operate according to their own norms and resources" -- a view that OIA and the divisions and offices that participate in the MRI program strongly share. No significant flaws were identified by the COV to warrant major changes in the distributed nature of MRI reviews. The COV also recommended that OIA and the MRI program continue to enhance outreach activities, particularly to women and minorities that are underrepresented in science and engineering. OIA agrees that outreach activities must include all demographic groups to ensure that representative participation in the MRI program is achieved.

COV RECOMMENDATIONS AND OIA RESPONSES

1. PROPOSAL REVIEW PROCESS AND REVIEW DOCUMENTATION

A major thread throughout the 2010 COV report related to the uniformity and transparency of the MRI review process, with a particular mention of the quality of the review process for large-dollar and development MRI proposals. Specific COV recommendations include: 1) providing examples of proposal review best practices to the MRI technical coordinators across the foundation; 2) continued attention to quality documentation of the review process including individual reviews, panel summaries and program officer review analyses; and 3) greater use of risk mitigation strategies prior to development awards and those above a certain dollar threshold. Additionally, the COV was concerned that reviewers were not provided enough information on stewardship of prior MRI awards at the institutional level, and recommended that OIA/MRI develop a mechanism whereby institutional stewardship can be evaluated.

The COV also noted that it would have liked to have seen "essentially identical review processes" (e.g., ad hoc mail and panel reviews) carried out by each of the disciplinary areas. However, at the same time the report notes that the COV recognizes the key role that the disciplinary reviews play, and the necessity for these disciplinary areas to operate according to their own norms and resources. The COV did recommend that each of the NSF's program area

COVs receive an additional charge to review the quality and uniformity of the MRI review process within their respective disciplinary areas.

MRI Program Response:

OIA welcomes the COV's recognition and endorsement of cultural differences in the review process among disciplinary units, and notes that an identical review process, while providing uniformity, would impede the flexibility that the COV itself acknowledges to be an essential aspect of the review process. As highlighted by MRI staff during presentations to the COV, MRI proposals are reviewed by divisions/offices with expertise in the research areas that will be served by the instruments. This model, which is strongly endorsed across the participating NSF divisions and offices, inevitably results in review and recommendation methodologies that are appropriate and consistent for the divisions/offices in which proposals are handled. No significant flaws were identified by the COV to warrant major changes in the distributed nature of MRI reviews. OIA notes that MRI award/decline decisions are considered as part of the portfolio of every disciplinary COV, and hence an additional charge to disciplinary COVs to review the quality and uniformity of the MRI review process within divisions/offices is not required.

OIA shares the COV view that that the MRI review analyses do, in most cases, provide good documentation and justification of award decisions. Nevertheless OIA recognizes the ongoing need to ensure transparency in the review process. OIA will continue efforts to promote greater transparency by working with MRI program officers to develop and implement best practices for merit review of MRI proposals. OIA agrees that documentation that clearly explains why award and decline recommendations were made must be provided.

OIA will also continue to explore ways, in addition to guidance currently provided through reviewer letters and panel slides, to remind reviewers that their reviews should be substantive and useful to the PI and describe both the strengths and weaknesses of a proposal. OIA believes it is important for PIs to understand the rationale for individual ratings and the context for comments provided by reviewers.

OIA will also explore methods to ensure that important information is available to reviewers and program officers during the review of the most complex proposals (e.g., development proposals and the largest dollar-value MRI proposals) when they are being considered for award. Consideration will be given to information that would lead to improved pre-award decision making, risk mitigation procedures, and the facilitation of improved post-award management of such projects. OIA agrees that continued evolution of risk mitigation procedures, especially for the most complex projects that are supported by MRI, provide an opportunity for improvement in MRI program management.

The COV recommended that OIA develop a mechanism whereby institutional stewardship of prior MRI awards can be assessed. As a result of this advice, effective with the FY2011 MRI solicitation, institutions are required to list the MRI awards they have received during the previous five years and provide a brief summary of the status of that instrumentation. Reviewers will consider this information in the context of the institutional commitment during the proposal review process. The MRI program will evaluate the impact of this change during upcoming MRI competitions and report the results in its annual COV updates.

2. THE MRI PROPOSAL AND AWARD PORTFOLIO

The COV had several findings and recommendations concerning the proposal and award portfolio, particularly relating to demographic balance. Specific recommendations included: 1) greater outreach efforts to minority serving institutions (MSIs), women, minorities and new PIs to increase their numbers as reviewers and as PIs on proposal submissions; 2) minimizing the numbers of proposals that are returned without review; and 3) that an additional charge be given to disciplinary-specific COVs to evaluate whether or not the fraction of women and minorities submitting MRI proposals reflects their actual compositions in that discipline.

MRI Program Response:

OIA is pleased with the portfolio findings of the COV which found that the success rates for varied institutions that participated in the MRI program are similar across MSIs, non-PhD-granting institutions, and Ph.D.-granting research-intensive institutions. Additionally, the COV report notes that the MRI success rates for EPSCoR and non-EPSCoR jurisdictions were comparable. The COV found no evidence to indicate a variation in the quality of funded proposals with geography or institutional type. Finally, the COV found that MRI proposals with minority or women involvement have had success rates comparable to proposals without minority or women involvement.

Nevertheless, OIA agrees with the sense of the COV that outreach activities must include all demographic groups and that outreach activities should include both proposers and reviewers. Already since the 2010 COV report OIA has promoted MRI participation at the 2010 national meeting of the Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) and in a Quality Education for Minorities (QEM) workshop that specifically targets potential MRI PIs. Outreach materials include data that illustrate similar success rates for the demographic groups that participate in MRI. Strong statements are also made about the benefits of participating as an NSF/MRI reviewer, to gain a better understanding of the MRI review process and hence to write a better proposal. OIA MRI staff and MRI program officers will continue to undertake outreach activities, and target opportunities to reach women, minorities and new PIs as appropriate.

The COV encouraged the MRI program to find mechanisms to minimize the numbers of proposals that are returned without review. OIA will work proactively to facilitate this goal. Since FY2009 MRI, MRI solicitations have included a checklist that mirrors the proposal compliance checklist used by the MRI program. Additionally the "Important Information and Revision Notes" section of each MRI solicitation is utilized to note significant changes that need to be considered by the PI. Both of these sections help PIs avoid return without review decisions. The use of this information is highlighted in outreach activities including webcasts that reach large audiences.

The COV recommended that a charge be given to disciplinary-specific COVs to evaluate whether or not the fraction of women and minorities submitting MRI proposals reflects their actual compositions in that discipline. This issue is complicated by the fact that MRI submissions received by NSF reflect decisions made by institutions, due to institutional submission limits for MRI, and not as a result of PI demographics within departments. The COV endorsed the use of institutional submission limits, but did note that the limits may impact the submission rates of

women and minority PIs. OIA agrees that a better understanding of the submission rates of women and minority PIs has merit, and OIA will explore such an assessment in collaboration with program officers from each MRI disciplinary area. In a related recommendation, the COV noted that NSF/MRI needs to make a strong statement that it is evaluating the participation by women and minorities in its proposals. Since the special summer 2009 "MRI-R^2" competition (not the purview of the 2010 MRI COV), solicitations have specifically noted that reviewers will assess "the extent to which the proposed project will…broaden the participation in science and engineering research by women, underrepresented minorities and persons with disabilities." The MRI program will continue to highlight this statement during outreach presentations to emphasize that NSF/MRI is committed to diversity, and deems it central to the programs, projects, and activities it considers and supports.

3. OTHER QUESTIONS

The COV commented on several specific questions not already addressed, including:
1) the use of an additional proposal submission specifically to support instrument development; 2) the role of software and virtual instruments as major research instrumentation; and 3) the potential role of MRI in meeting the need for mid-scale instrumentation costing more than $6 million (the authorized funding cap for individual MRI awards depends on MRI's annual appropriation).

MRI Program Responses:

The COV felt that program's use of an additional institutional submission to support development activities was appropriate. The MRI program appreciates the COV's affirmation of the program management tool, which encourages proposals for the development of new instruments with enhanced or potentially transformative capabilities.

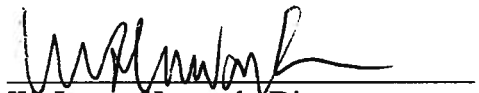
Instrumentation needs are constantly evolving and the COV was also asked to comment on the role of software and virtual instruments as major research instrumentation. OIA appreciates the COV advice that software and virtual instruments as major research instrumentation might be candidates for MRI support if they are not appropriate for funding through other NSF programs. The COV felt that any MRI-supported software must be seen as an instrument that serves a specific scientific interest of a research community, be a final product deployed in concert with a (physical) instrument, and/or be a simulation tool or cyberinfrastructure. Based in part on this advice, and effective with the FY 2011 solicitation, the MRI goals have been modified to include "the acquisition and development of research instrumentation that makes use of, advances, and/or expands the Nation's cyberinfrastructure and/or high performance computing capability (while avoiding duplication of services already provided by NSF investments). MRI proposals that are aligned with the evolving NSF vision (see "Cyberinfrastructure Framework for 21st Century Science and Engineering" at http://www.nsf.gov/pubs/2010/nsf10015/nsf10015.pdf), including those that support development of computational and data-intensive science and engineering programs, or that provide pathways to regional and national infrastructure, are strongly encouraged."
The MRI program will evaluate the impact of this change during upcoming MRI competitions.

The COV was asked to comment on the role of MRI in meeting the need for mid-scale instrumentation costing more than $6 million (the authorized program cap depends on the MRI

appropriation). The COV recommends that OIA manage any possible Foundation-wide mid-scale program. OIA appreciates the confidence that this recommendation represents in terms of OIA's Foundation-wide management role. This recommendation will be forwarded to senior NSF management for their consideration.

Finally, the COV feels that the COV report template needs to be rethought and simplified. This recommendation will be forwarded to the NSF-wide COV monitoring group for their consideration.

On behalf of the National Science Foundation, OIA wishes to thank Dr. Lineberger and the members of the 2010 MRI COV for their dedicated effort which led to the COV report's thoughtful comments and advice. The MRI program agrees with COV recommendation to include at least one member of the 2010 MRI COV as a member of the next MRI COV. OIA would also like to thank all of the MRI program officers and staff across the Foundation that serve to make this a successful program.



W. Lance Haworth, Director
Office of Integrative Activities

29 December 2010